GROWTH PERFORMANCE OF STALL-FED GOATS UNDER PROBIOTIC SUPPLEMENTATION

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ABSTRACT

The study was conducted to assess the growth performance of stall fed goats supplemented with different probiotic microbial cultures for a period of eight fortnights from weaning. Twenty-four weaned local non-descript female kids were selected at random and they were divided into four groups comprising 6 kids in each group.The first group of animals was supplemented with Saccharomyces cerevisiae, the second group of animals with Aspergillus oryzae plus lactic acid bacteria and the third group with Saccharomyces cerevisiae plus lactic acid bacteria. The fourth group of animals was not supplemented with probiotic cultures and treated as control. The probiotics were incorporated in concentrate feed. It was found that the body weight and average daily gain of probiotic supplemented kids were significantly ($P < 0.05$) higher than control group kids, but the difference among probiotic supplemented groups were non significant. A similar trend was observed in the body measurements viz. body length, height, heart girth and paunch girth.

Key Words: Growth, probiotic supplementation, concentrate feed, stall fed local goat

INTRODUCTION

In the intensive goat production systems, there are many substances used as growth promoting agents such as enzymes, ß-agonists, ionophores, growth hormones, antibiotics and probiotics. Different microbial feed additives (probiotics) like yeast, bacteria and fungi are used for manipulating rumen fermentation and the microbial eco-system of gastrointestinal tract of animals, to harvest maximum energy from the feed fed to the animals. Among the different microbial feed additives, *Saccharomyces cerevisiae* and *Aspergillus oryzae* are more effective in rumen, where as lactobacilli are effective at pre ruminant stage itself (Khuntia and Choudhary 2002). It is generally presumed that the microbial feed supplements improve the animals production performance. By fore going the above fact the present study was conducted to assess the impact of probiotic supplementation on growth performance of stall-fed local goats.

MATERIALS AND METHODS

A study was conducted to assess the growth performance of stall fed goats supplemented with different probiotic microbial cultures at Livestock Research Station, Kattupakkam for a period of eight fortnights from weaning. Twenty-four weaned local non-descript female kids were randomly selected and allotted to four different treatments based on initial body weight comprising 6 kids in each group. The first group of animals (T_1)was supplemented with *Saccharomyces cerevisiae*, the second group of

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animals (T_2) with *Aspergillus oryzae* plus lactic acid bacteria and the third group (T_3)with *Saccharomyces cerevisiae* plus lactic acid bacteria. The fourth group of animals(T_4) was not supplemented with probiotic cultures and treated as control. The probiotics were incorporated @ 1 g per kg of concentrate feed. The experimental animals under all groups were fed with equal amount of concentrate and *ad libitum* quality of green fodder. Body weight and body measurements were taken initially and subsequently once in a fortnight. The data obtained in the study were analysed statistically (Snedecor and Cochran, 1994).

RESULTS AND DISCUSSION

The final body weight of *Saccharomyces cerevisiae* supplemented kids was 14.71 ± 0.51 kg, *Aspergillus oryzae* plus lactic acid bacteria supplemented kids was 14.45 ± 0.45 kg, *Saccharomyces cerevisiae* plus lactic acid bacteria supplemented kids was 15.11 ± 0.47 kg and unsupplemented kids was 13.01 ± 0.46 kg (Table 1). The statistical analysis showed that the final body weight of probiotic supplemented kids was significantly ($P<0.05$) higher than unsupplemented kids, but the body weight among probiotic supplemented kids were not significantly different. The results of the present study was also in agreement with the findings of Meenakshi Sundaram (2001) who observed that Madras Red lambs reared in intensive system on mud floor with probiotic supplementation (*Saccharomyces cerevisiae* plus *Bacillus coagulans*) had higher body weight than unsupplemented lambs.

The overall average daily gain of the experimental kids under *Saccharomyces cerevisiae* plus lactic acid bacteria supplementation was higher (62.78 ± 5.05 g) among the treatments followed by *Saccharomyces cerevisiae* supplemented kids (59.99 ± 4.70 g) and *Aspergillus oryzae* plus lactic acid bacteria supplemented kids (55.69 ± 4.55 g). The average daily gain of all probiotic supplemented kids was significantly ($P<0.01$) higher than control (44.98 ± 3.00 g). The average daily gain did not differ significantly among the different probiotic supplemented animals. The observations of the present study was in agreement with Prahalada *et al.* (2001) who stated that the calves supplemented with yeast culture had higher average daily gain than control and Raman *et al.* (1998) who stated that the crossbred calves reared with *Saccharomyces cerevisiae* plus *lactobacillus acidophilus* had higher average daily gain and also Rameshwar Singh *et al.* (1998) who reported that the calves supplemented with *Saccharomyces cerevisiae* had higher average daily gain.

The final body length of animals in group T_1, T_2, T_3 and control was 51.33 ± 1.12, 53.58 ± 1.10, 53.91 ± 1.04 and 51.16 ± 1.10 cm respectively. On the critical analysis the final body length of T_2 and T_3 groups was significantly ($P<0.05$) higher than control. The body height at withers of experimental animals differed significantly ($P<0.05$) from fifth fortnight onwards as seen from table 4. The final body height of group T_1 to T_3 and control was 55.42 ± 0.52, 54.17± 0.81, 54.83 ± 0.95 and 51.67 ± 0.83 cm respectively. Based on the critical difference analysis the body height did not differ among probiotic supplemented groups.

The heart girth of experimental animals differed significantly ($P<0.05$) from fifth fortnight onwards. The final heart girth measurements for group T_1, T_2, T_3 and control was 58.25 ± 0.77, 59.33 ± 0.88, 58.17 ± 1.08 and 55.50 ± 0.76 cm. The final heart girth of all probiotic supplemented groups was significantly ($P<0.05$) higher than control. The Paunch girth of experimental animals differed significantly ($P<0.05$) from fourth fortnight onwards. The final paunch girth measurements for group T_1, T_2, T_3 and control was 63.25 ± 0.95, 62.83 ± 1.08 ± 63.58 ± 0.88 and 59.83 ± 1.12 cm. The paunch girth of all probiotic supplemented groups was significantly ($P<0.05$) higher than control.

All the body measurements were increased with increase in live weight and age. Patro and Mishra (1987) found similar trend in Ganjam goats in which the body measurements were increased with increasing body weight and age. It can be concluded

from the observations that the differences in the body weight for kids under different treatment groups also reflected in the body measurements as well, since the body measurements have a direct correlation with body weights.

From the study it is inferred that probiotics supplementation brings about positive response in live weight gain in goats.

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Table 1

Fortnightly mean ± S.E. of body weight in kg of the experimental animals under different probiotic supplementation

Fortnight / Treatment	0	1	2	3	4	5	6	7	8
Group T_1	7.48 ± 0.34	8.01 ± 0.33	8.73 ± 0.33	9.60 ± 0.41	10.50 ± 0.44	11.46 ± 0.47	12.50^{ab} ± 0.44	13.60^{b} ± 0.48	14.71^{b} ± 0.51
Group T_2	7.51 ± 0.31	8.06 ± 0.30	8.68 ± 0.26	9.60 ± 0.32	10.50 ± 0.34	11.60 ± 0.34	12.30^{ab} ± 0.32	13.30^{ab} ± 0.33	14.45^{b} ± 0.45
Group T_3	7.56 ± 0.32	8.10 ± 0.38	8.93 ± 0.51	9.90 ± 0.48	10.80 ± 0.52	11.76 ± 0.52	13.13^{b} ± 0.52	13.81^{b} ± 0.49	15.11^{b} ± 0.47
Control	7.56 ± 0.28	8.11 ± 0.32	8.78 ± 0.36	9.30 ± 0.40	9.90 ± 0.43	10.60 ± 0.40	11.30^{a} ± 0.40	12.10^{a} ± 0.38	13.01^{a} ± 0.46
`F' Value	0.01	0.01	0.08	0.35	1.41	2.14	3.16*	3.22*	3.71*

* Significant at five percent level (P<0.05) ; Means bearing different superscript in each column differ significantly

Table 2

Fortnightly mean ± S.E. of average daily gain in grams

Fortnight / Treatment	1	2	3	4	5	6	7	8	Overall
Group T_1	35.55 ± 3.73	47.77 ± 5.01	57.77 ± 9.87	57.77 ± 3.73	66.66 ± 3.86	66.66 ± 4.59	73.33 ± 4.23	74.44 ± 3.63	59.99^{b} ± 4.70
Group T_2	36.66 ± 3.34	41.10 ± 5.57	61.10 ± 5.57	59.99 ± 3.86	73.33 ± 5.46	46.66 ± 3.86	66.66 ± 2.44	59.99 ± 9.30	55.68^{b} ± 4.55
Group T_3	35.55 ± 4.78	55.55 ± 10.02	64.44 ± 4.78	59.99 ± 6.23	66.66 ± 3.45	66.66 ± 2.99	66.65 ± 3.86	86.77 ± 5.08	62.78^{b} ± 5.05
Control	36.66 ± 4.48	44.44 ± 4.11	34.44 ± 4.70	39.99 ± 2.44	44.44 ± 3.30	46.66 ± 2.44	53.33 ± 2.44	59.95 ± 9.14	44.98^{a} ± 3.00

Means bearing different superscript in a column differ significantly

Table 3

Fortnightly mean ± S.E. of body length in cm

Fortnight / Treatment	0	1	2	3	4	5	6	7	8
Group T_1	37.16 ± 0.84	38.08 ± 0.74	39.91 ± 0.67	42.08 ± 0.92	44.08 ± 1.21	46.03 ± 0.94	48.16 ± 0.80	49.83^{a} ± 1.03	51.33^{a} ± 1.12
Group T_2	38.16 ± 0.90	39.16 ± 0.93	41.08 ± 0.55	42.66 ± 0.57	45.11 ± 0.72	47.83 ± 0.87	49.58 ± 0.64	51.16^{b} ± 0.83	53.58^{b} ± 1.00
Group T_3	37.83 ± 0.61	38.91 ± 0.73	41.16 ± 0.54	43.00 ± 0.37	45.83 ± 0.70	48.00 ± 0.77	49.67 ± 0.49	51.33^{b} ± 0.88	53.91^{b} ± 1.04
Control	37.33 ± 0.65	38.25 ± 0.85	40.16 ± 0.75	42.08 ± 0.76	44.16 ± 0.79	46.08 ± 0.83	48.33 ± 0.88	49.08^{a} ± 0.95	51.16^{a} ± 1.10
`F' Value	0.36	0.40	1.16	0.50	0.68	2.73	2.78	3.63^{*}	3.27^{*}

Table 4

Fortnightly mean ± S.E. of height at withers in cm

Fortnight / Treatment	0	1	2	3	4	5	6	7	8
Group T_1	40.41 ± 0.88	42.16 ± 0.91	43.33 ± 0.88	44.08 ± 0.82	47.00 ± 0.73	49.83^{b} ± 0.54	51.67^{b} ± 0.67	53.08^{b} ± 0.80	55.42^{b} ± 0.52
Group T_2	41.33 ± 0.76	43.08 ± 0.67	44.16 ± 0.82	45.25 ± 0.65	46.17 ± 0.68	48.16^{ab} ± 0.75	50.50^{b} ± 0.76	52.83^{b} ± 0.60	54.17^{b} ± 0.87
Group T_3	41.00 ± 1.06	42.83 ± 0.94	44.67 ± 0.92	46.17 ± 0.83	48.16 ± 0.79	49.00^{b} ± 0.93	51.83^{b} ± 1.05	52.17^{b} ± 1.05	54.83^{b} ± 0.95
Control	41.50 ± 0.88	42.33 ± 0.83	43.50 ± 0.67	44.41 ± 0.69	45.50 ± 0.67	46.66^{a} ± 0.76	48.00^{a} ± 0.89	49.58^{a} ± 0.64	51.67^{a} ± 0.83
`F' value	0.28	0.35	0.55	1.53	2.56	3.51^{*}	4.28^{*}	4.08^{*}	4.15^{*}

*Significant at five percent level (P<0.05) ; Means bearing different superscript in each column differ significantly

Table 5

Fortnightly mean ± S.E. of heart girth in cm

Fortnight / Treatment	0	1	2	3	4	5	6	7	8
Group T_1	44.25 ± 0.77	45.10 ± 0.84	47.16 ± 0.87	49.33 ± 1.12	51.08 ± 1.56	53.41^{ab} ± 1.13	55.33^{b} ± 1.05	56.83^{ab} ± 0.91	58.25^{b} ± 0.77
Group T_2	44.16 ± 0.94	46.00 ± 0.90	48.16 ± 0.94	51.83 ± 0.75	53.67 ± 0.95	54.83^{b} ± 1.01	55.92^{b} ± 1.02	57.75^{b} ± 0.98	59.33^{b} ± 0.88
Group T_3	44.00 ± 0.96	45.50 ± 0.88	47.25 ± 0.91	50.16 ± 0.98	53.17 ± 1.25	55.92^{b} ± 1.33	56.58^{b} ± 1.07	57.92^{b} ± 1.31	58.17^{b} ± 1.08
Control	44.25 ± 0.89	45.16 ± 0.75	48.00 ± 0.78	48.41 ± 0.88	49.92 ± 0.71	51.17^{a} ± 0.95	52.75^{a} ± 0.73	54.08^{a} ± 0.74	55.50^{a} ± 0.76
`F' value	0.26	0.78	0.07	2.37	2.29	3.39*	3.34*	3.12*	3.41*

Table 6

Fortnightly mean ± S.E. of paunch girth in cm

Fortnight / Treatment	0	1	2	3	4	5	6	7	8
Group T_1	45.50 ± 0.72	46.75 ± 0.60	50.00 ± 0.68	52.33 ± 0.63	54.25^{b} ± 0.77	57.50^{ab} ± 0.67	60.33^{c} ± 0.68	61.58^{b} ± 0.71	63.25^{b} ± 0.95
Group T_2	46.25 ± 0.85	48.00 ± 1.12	50.16 ± 1.19	52.00 ± 1.29	55.50^{b} ± 1.34	56.83^{ab} ± 1.14	57.33^{ab} ± 1.14	59.00^{a} ± 0.96	62.83^{b} ± 1.08
Group T_3	46.00 ± 0.67	48.25± 0.65	51.50 ± 0.62	54.83 ± 0.70	56.67^{b} ± 0.67	58.66^{b} ± 0.99	59.16^{bc} ± 0.91	60.67^{ab} ± 0.96	63.58^{b} ± 0.88
Control	46.58 ± 0.69	48.33 ± 0.80	51.00 ± 0.73	51.91 ± 0.81	52.75^{a} ± 0.87	55.33^{a} ± 0.71	56.50^{a} ± 0.95	58.41^{a} ± 0.93	59.83^{a} ± 1.12
`F' value	0.38	0.80	1.03	2.39	3.12*	3.39*	3.47*	3.16*	3.24*

* Significant at five percent level (P< 0.05) ; Means bearing different superscript in each column differ significantly